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Qualitative research on the importance and need for home-based telecare services for elderly people

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ABSTRACT

Background/Purpose: Aging society has become a worldwide issue in recent years. Elderly people are considered to have higher risks of contracting multiple chronic diseases and comorbidities, thus increasing the need for care. Currently, efforts to develop long-term care for elderly people thrives more than before. Telecare has the potential to improve intractable problems in health care, such as limited access, uneven quality of care and cost inflation. The main purpose of this research is to investigate the key service items of home-based telecare that are important to elderly people and to identify their needs to make a more specific blueprint for future development.

Methods: A qualitative study was conducted by applying the expert panel method and a questionnaire survey. The purpose of the expert panel was to clarify and unify the scope and the main objectives of this research which would help to develop the structure of the questionnaire so as to manipulate and conduct analysis in the research.

Results: Through the expert panel, 15 service items and products were selected and unified. The average showed that the present performance was generally considered good. There were some differences between the scores of the three members of the panel, which revealed the existence of contrary opinions to each stakeholder's party.

Conclusion: The study provided a closer inspection of the issue of the nonegalitarian reality of telecare. Based on the INA matrix, service items and products were narrowed down to eight, which is half of the original service items and products provided. In addition, it was easy to observe the priorities among service items and products when providing service items and products to elderly people.

1. Introduction

Aging society has become a worldwide issue in recent years. According to the definition of the World Health Organization (WHO), a country is considered to be an aging society when the proportion of the population over 65 reaches 7%, as aged society when the proportion reaches 14%, and as superaged society at 20%. Due to economic growth and medical improvements, Taiwan now faces dramatic demographic changes. The percentage of elderly people in Taiwan exceeded 7% in 1993, and reached 11% in 2011. It is estimated that Taiwan will become an aged society in 2018 and super-aged in 2025.[1,2]

Elderly people are considered to have higher risks of contracting multiple chronic diseases and comorbidities, thus increasing the need for care. Many study results show that age is one of the major affective factors in health care utilization.[3,4] Based on reports from the Department of Health in Taiwan, elderly outpatients over 65 years old accounted for 33% of total services. In addition, the annual health care expenditure of the 60–69-year-old group in Taiwan was 81,677 NT dollars (approximately 2720 U.S. dollars) in 2006, which is almost twice that of the 50–59-year-old group, or four times more than the 40–49-year-old group. Both health care utilization and expenditure in Taiwan are consistent with these findings.

In this climate, development of long-term care for elderly people thrives more than before. In the 1960s, European countries proposed the idea of aging in place. The concept was to let elderly people stay in a familiar environment as long as possible in order to slow down malfunctioning. Community and home-based care

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gradually earned its own value and prestige in many countries. Taiwan also followed this trend and transitioned to long-term care policy adopting community and home-based care. In 1999, the Department of Health in Taiwan declared that long-term care policies should focus on community and home-based development. Community and home-based care is the future goal in Taiwan.

According to the report conducted by the UN in 2005, it was shown that living with a child or grandchild is the most common type of living arrangement among older persons in Latin America and the Caribbean, Asia, and Africa. In particular, living with a child is considered the top preference of living arrangements in Taiwan, Japan, and South Korea. In Taiwan, this preference has remained the same since 2005.[5] The overview of elderly people's living status in 2011 shows that the ideal living status for an elderly person is living with a child; living with a spouse takes second place. Living in institutions accounts only for 3% of preferences. In this given situation, most elderly people who keep or wish to keep their daily lives at home need different degrees of health care. Some may need mild assistance such as medication guides, whereas others may need multiple functions to sustain their basic activities of daily living. However, the environment at home, unlike in institutions which have sufficient facilities and well-trained staff, cannot always provide professional help in time and can consequently influence health maintenance.[6]

Due to technological innovation, there are more and more applications available across different expert fields, and the medical field is no exception. Home-based telecare was first developed for patients with chronic diseases such as heart failure, diabetes, asthma, and chronic obstructive pulmonary disease (COPD).[7] Thereafter, its application was expanded to include other vulnerable populations.[8] Considering the close relationship between care needs and underlying medical conditions, we adopt an extended definition of home-based telecare. In this paper, we regard home-based telecare as all kinds of integrated health care services that use information and communication technology (ICT) to maintain safety and autonomy in the living environment.[9–11] Telecare may combine all kinds of assistive or enabling technologies to provide a total care package that requires very little of the person-to-person interaction currently associated with care in and by the community.[12]

With the rise in the home-based care population in recent decades, many companies and organizations in the health care field have become prosperous through emerging service items and products that target elderly people. According to a report by the Ministry of Economic Affairs in Taiwan, profit from the application of wireless health care in America continues to increase from 0.3 billion United States dollars in 2009 to 4.4 billion United States dollars. In Taiwan, Executive Yuan also launched a Health cloud project in 2013, whose aim was to create a ubiquitous health care environment by connecting associated systems among the medical, care, health protection, public health promotion, and disease control services. Rising demand for combined ICT technology and personalized health care services has created a huge business market for home-based telecare.[13] In view of this trend, the main purpose of this research is to discover the key service items of home-based telecare that are important to elderly people in the hope of identifying their needs so as to make a more specific blueprint for future development.

2. Methods

A qualitative study was conducted by applying the expert panel method and a questionnaire survey approach. The expert panel was to clarify and unify the scope and main measure objectives of this research and help to construct the questionnaire. The expert panel was then asked to fill in the questionnaire in order to manipulate and conduct analysis in the research.

2.1. Expert panel

Service items and products were first collected through secondary data by reviewing published research papers. Other available documents such as industry reports were also taken into account as reference.[14–17] However, service items and products were developed and manufactured individually. Consequently, it brought to light the fact that similar types of service items or products provided roughly the same service contents, but each had some distinct details when closely inspected. In order to provide a basic widespread concept toward each home-based telecare service and to ensure the consistent conception and definition of each service item or product, the expert panel method was introduced and applied in this research. Expert panels are used to systematically solicit, organize, and structure collective judgments and opinions on particularly complex subject matters by an authoritative group. In accordance with the essence of the expert panel, a heterogeneous group provides comprehensive perspectives and reduces bias.[18,19] Therefore, diversity stakeholders in telecare should be taken into consideration. Three distinguished but associated authorities were assembled in the expert panel. They were product manufacturers in the industry, medical suppliers in the health care system, and the end-users – elderly people. Two senior managers who work in one of the major companies in telecare in Taiwan agreed to represent their field in our interview. Three medical directors of geriatrics and gerontology in one of the largest medical centers in Taiwan were represented in this research. Two elderly people who had experience and constantly used one of those service items or products over the past 2 years were presented as end-users. However, it should be noted that selection of our panel members was not random, but designed to enhance collective knowledge. Two researchers reviewed and revised expert panel open-ended questions until an agreement was reached. Each panel received a manuscript that contained descriptions of the others. Panel members were contacted individually when researchers needed clarification regarding their comments.

2.2. Data analysis

Based on the results of the previous stage, a provisional questionnaire was constructed to determine the importance and degree of need for all service items and products. The questionnaire was developed with a likert-type scale to discover the difference in importance of and the degrees of need for service items. In this research, importance was defined as the value or influence of a particular item when providing health care to elderly people. However, the definition of the degrees of need was the perception of lack of a particular item for elderly people. Open-ended questions were also included in the questionnaire to record responses and details that were not reflected on the scale. After finishing interviews, we applied a descriptive statistic method to analyze the score of the likert-type scale questionnaire. As there is little known about the different perspectives of the three parties in previous studies in the area of telecare, descriptive statistics were suitable for exploratory investigation and provided a grasp of the new field. Secondly, we developed an importance-need analysis matrix (INA) based on the average score of each item and product. Through the INA matrix, service items were relocated to corresponding positions. By this means, we could explain more thoroughly the relationship between importance and the degree of need of each service item and determine individual value and actual performance as perceived by the expert panel.

Table 1
Home-based telecare service items and products.

Category	Service item	Operation process	Function
Functional oriented	Medical reminder	(1) Reminder to take medicine on time according to the prescriptions through internet platform or ICT device (2) Send medication information to elderly people or their family members via the internet or text	Prevent the wrong dosage or taking medications at the wrong time
	Vital sign detector	A wearable device that observes and records a person's basic body condition which may include heart rate, body temperature, etc.	Real-time monitoring of physiological conditions to help disease prevention at early stage
	Abnormal event reporter	A wireless system with sensors located at different points in the user's home to identify any abnormal activity patterns to a monitor center or family members	Alert unpredictable accidents at home, take necessary measures, and prevent more severe situation in advance
	Tracking monitor	A wearable device that monitors and tracks users location via wireless or GPS in community or around a certain area	Ensure security of elderly and enable them caution-free on movements
	Home care assistant	A platform providing arrangements to all kinds of daily life services by trained staff such as house cleaning and grocery shopping	Supplementary service for elderly people or family members to ease their load
	Healthy diet delivery	A platform providing meal ordering and delivering including healthy and special diets	Supplementary service for elderly or family members to ensure elderly people have appropriate nutrition
Social–psychological oriented	Communicable network	An interaction media allowing patients and families to interact with other patients with the same or similar health problems or interests	Enhance information exchange and create a supportive social network in the group
	Social supportive network	A link between elderly people and social supportive network which provides adequate social welfare and social aid in the community	Acknowledge elderly people of their equity on social welfare and provide alternatives for elderly people if needed
Educational oriented	Medication guide	An interactive surface for inquiry medication guide including usage and possible side effects	Increase knowledge of medication and prevent potential medication abuse
	Health knowledge education	A platform providing all kinds of basic, correct, and new health information via media	Health promotion for elderly people intention to raise health awareness of elderly people
	Self-rehabilitation	A platform providing home rehabilitation guide to assist elderly people who have needs	Enhance self-rehabilitation knowledge, improve completion of rehabilitation course, and reduce unnecessary visits to hospital
Integrated function	Outpatient arrangement	A link between ambulatory services and elderly people in need of help arranging and reminding them of visits	(1) Make arrangement to doctors easier for elderly people (2) Keep regular ambulatory services for elderly people with chronic diseases
	24 hrs Call center	A single tab or trigger device connected to well-trained staff whenever needed	An immediate connection to solve or prevent unpredictable accidents
	Visual health consultation	A camera system providing visual consultations with professional medical staff such as nurse or nutritionist	Provide an interactive connection with visuals to solve non-emergency, medical relevance and specific problems
	Health cloud	A multiple resources integrated interface with storage, inquiry, and interactive functions to systematically sort information out from data	Provide effective and efficient health management for elderly people

3. Results

After processing by the expert panel, 15 items were sorted out and selected for research. The expert panel agreed that each element selected was unique and could represent its own type of service. Furthermore, they were classified into four categories: function-oriented, socially–psychologically-oriented, education-oriented, and integrated function. The operation process and function of each telecare service item or product are shown in Table 1.

We analyzed the likert-type questionnaire. The result is summarized in Table 2 below. The overall average of the importance was from 3.14 to 4.57.Among all service items, the highest score of importance was "Abnormal event reporter" (4.57), and the lowest were "Healthy diet delivery", "Communicable network", and "Socially supportive network" (3.14). The average of the degree of need was from 2.86 to 4.29. The service items with the highest scores were "Medication guide", "Health knowledge education", and "Self-rehabilitation" (4.29), and the lowest was "Communication network". The mode of importance and degree of need showed a similar trend with the average. Both the average and mode had higher scores in importance than in the degree of need for most items. However, there were a few items contrary to the majority such as "Healthy diet delivery", "Social supportive network", "Health knowledge education", and "Health cloud". In summary, all items showed a score of 3 out of 5 in importance and most of them were also the same in the degree of need. The present performance was at least considered good.

Secondly, the three parties displayed some difference when comparing the average score with each other. In the function-oriented dimension, "Home care assistant" and "Health diet delivery" received lower scores in the end-users' perception of both importance and the degree of need, whereas they were viewed as being of higher value for medical suppliers and industry. In the socially–psychologically-oriented dimension, the end-users' opinions showed the same contrary condition in both "Communicable network" and "Social supportive network" in comparison with medical suppliers and industry. However, the expert panel displayed most consistency toward items in the education-oriented dimension. Finally, in the integrated function-oriented dimension, two items, "24-hr Call center" and "Health cloud", showed contradictory results when comparing scores. "24-hr Call center" received a lower score from end-users, but "Health cloud" from industry by contrast. In conclusion, the differentiation of the scores for the items revealed the contrary opinion of each stakeholder's party.

Table 2
The average of service items and products.

Category	Service item	End user		Medical supplier		Industry		Total	
		Importance	Degree of need	Importance	Degree of need	Importance	Degree of need	Importance	Degree of need
Functional oriented	Medical reminder (S1)	4.00	4.00	4.33	4.00	4.00	4.00	4.14	4.00
	Vital sign detector (S2)	4.00	3.50	3.67	4.00	4.00	4.00	3.86	3.86
	Abnormal event reporter(S3)	5.00	3.50	4.33	4.00	4.50	4.50	4.57	4.00
	Tracking monitor (S4)	5.00	3.50	3.33	3.33	3.00	3.00	3.71	3.29
	Home care assistant (S5)	2.00	2.50	4.00	3.67	4.00	4.00	3.43	3.43
	Healthy diet delivery (S6)	1.50	3.00	3.67	3.67	4.00	4.00	3.14	3.57
Social–psychological oriented	Communicable network (S7)	2.50	2.50	3.33	3.00	3.50	3.00	3.14	2.86
	Social supportive network(S8)	2.50	2.50	3.67	4.00	3.00	3.00	3.14	3.29
Educational oriented	Medication guide (S9)	4.50	4.00	4.00	4.33	4.50	4.50	4.29	4.29
	Health knowledge education (S10)	4.00	5.00	4.00	4.00	4.50	4.00	4.14	4.29
	Self-rehabilitation (S11)	4.50	4.50	4.00	4.33	4.50	4.00	4.29	4.29
Integrated function oriented	Outpatient arrangement (S12)	4.00	3.00	4.00	4.00	4.00	4.00	4.00	3.71
	24 hrs Call center (S13)	2.00	2.00	4.00	4.00	4.50	4.50	3.57	3.57
	Visual health consultation (S14)	4.00	4.00	4.00	3.67	3.00	3.00	3.71	3.57
	Health cloud (S15)	4.50	4.00	4.00	4.00	3.50	2.50	4.00	3.57
Total		3.60	3.43	3.89	3.87	3.90	3.73	3.81	3.70

Thirdly, we set up a matrix of importance and degree of need based on the average scores of service items. In Fig. 1, all service items could be classified by distribution pattern into two groups. Seven items were considered to be one group that represented relative importance and a high degree of need. These items were "Medical reminder" (S1), "Vital sign detector" (S2), "Abnormal event reporter" (S3), "Medication guide" (S9), "Health knowledge education" (S10), "Self-rehabilitation" (S11), and "Outpatient arrangement" (S12). In addition, "Health cloud" (S15), though slightly lower in degree of need, could be regarded as part of the same group. However, the other group with relatively lower importance and degree of need were "Tracking monitor" (S4), "Home care assistant" (S5), "Healthy diet delivery" (S6), "Communicable network" (S7), "Social supportive network" (S8), "24-hr Call center" (S13), and "Visual health consultation" (S14).

4. Discussion

Telecare has the potential to improve intractable problems in health care such as limited access, imbalanced quality of care, and cost inflation.[20] From the end-users perspective, many studies have proved that elderly people hold an optimistic attitude toward acceptance of telecare. The results also showed consistency with previous research by viewing the importance and the degree of need for elderly people with an average high score among end-users, medical suppliers, and industry. It also provided more solid evidence of this. In 2007, the EU started a project called The Active and Assisted Living Joint Programme (AAL JP), which is a funding activity that aims to create better living conditions for older adults and to strengthen industrial opportunities in Europe through the use of ICT. At least 20 countries have since become involved in this project. With this trend, we can foresee telecare becoming a fast developing health care service in the 21st century.

Many research studies have found that the content of service items or products was one of the crucial factors that influence elderly people when deciding which service or product to use.[21] Figs. 2 and 3 show the contradictions perfectly among end-users, medical suppliers, and industry. The area of end-users was significantly different from the other two components on the radar graphic both in importance and the degree of need. On the contrary, medical suppliers and industry manufacturers showed a high similarity. This provided a reasonable explanation for the fact that elderly people evaluated service items and products on the basis of their own concerns. Furthermore, some research show that many elderly people display a high level of acceptance of home-based telecare services in trials, but when acknowledging the expense of real application, such as initial facilitating and monthly maintenance, their willingness to use telecare drops sharply, especially for those who could not obtain subsidies from the government after

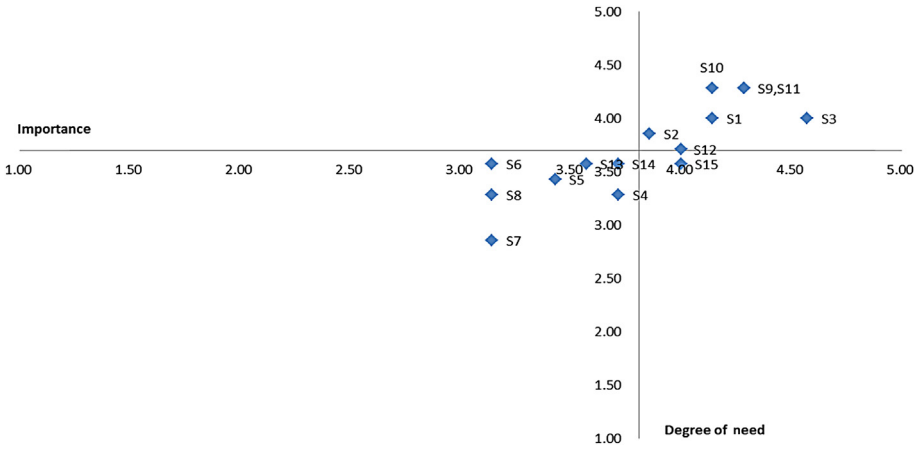

Fig. 1. INA matrix.

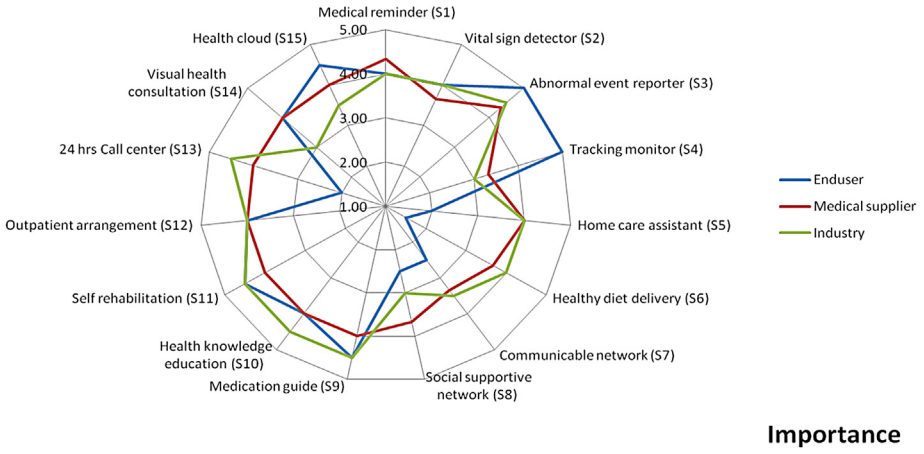

Fig. 2. Radar of importance.

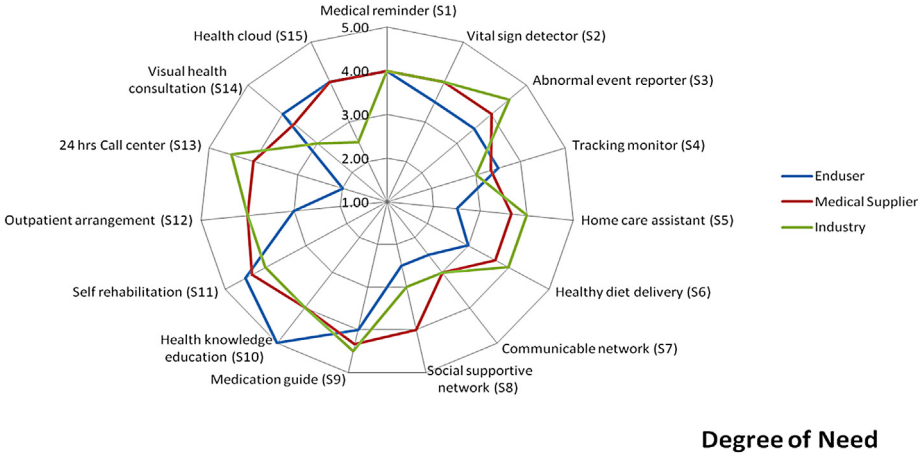

Fig. 3. Radar of the degree of need.

testing.[22] Moreover, retail prices for home-based telecare remain relatively high because of the initial costs. At this stage, home-based telecare still costs a fortune for a middle-class family when compared with seeing a doctor directly. The retail price of home-based telecare services may be one of the key factors that affect the end-user's motivation for applying.[23] In fact, how to build up a reasonable charge would be another challenge for most companies in the industry in Taiwan. If manufacturers cannot respond to the core values in elderly people's minds, service items and products will not earn value and build a reputation among end-users.[21] When creating service items, gaps resulting in unequal situations keep pushing potential users away. The potential benefits of home-based telecare could fail to be fully realized despite a well-equipped technology environment.

When examined from the national level, we found that medical organizations in Taiwan usually encourage people to see doctors more to keep certain profits in response to global budgets and pay-for-services under the health care policy. However, this is contradictory to the main purpose of home-based telecare, which is believed to help people enhance abilities to provide health management and reduce unnecessary medical expenses. This inevitably highlights the limitations of developing home-based telecare. To show true efficacy in home-based telecare, the government needs to rethink its own policies; let medical organizations take more responsibility for health promotion and proper responses to people's needs in the region.

5. Conclusion

This study focused on the importance and the degree of need for telecare service items and products. To achieve the main purpose, the expert panel method was applied. Based on the INA matrix, the number of service items and products were narrowed down to eight, which is half of the original service items and products provided. In addition, it is easy to view the priorities among service items and products when providing service items and products to elderly people. The future development of home-based telecare services needs to be more focused. Further research may concentrate on understanding in more detail the function of each service item and product that will actually trigger elderly people to start using services in telecare.

Conflicts of interest

The authors have no conflicts of interest to declare.

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